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and

The Association of County Sanitary Officers

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Pasteurisation & Sterilisation of Milk

August, 1950

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Pasteurisation & Sterilisation of Milk

August, 1950

PASTEURISATION AND STERILISATION OF MILK

MEMORANDUM

prepared by

THE JOINT COMMITTEE

TERMS OF REFERENCE

At the conclusion of the Refresher Course held in London in March the Joint Committee of County Medical Officers and County Sanitary Officers was asked to draw up a Memorandum dealing with the subject with particular reference to the matters raised during the Course. It was intended that the Memorandum should assist Licensing Authorities in considering applications and in supervising plants for the pasteurisation and sterilisation of milk, and one of the principal aims is to secure a measure of uniformity in essential matters.

We wish to make it clear that we have not set out to produce a treatise on the subject. This Memorandum is merely intended to underline what in our view are some of the more important factors to consider in dealing with this problem.

One of the major difficulties which Licensing Authorities may have to face will be shortages of equipment and poor premises for some while and although we are anxious that everything possible should be done to encourage dairymen—who have their own serious difficulties—there are certain technical standards which are dealt with in this Memorandum below which no establishment should be allowed to fall. If the essentials of efficient pasteurisation are met—and this involves an efficient pasteurisation plant as distinct from the particular form of construction of the building in which it is housed—then the Licensing Authorities may feel there is some scope, at least for a little while to come, to modify their immediate requirements on the understanding that the proper standard will be attained within a stated period. But we are unanimous in our view that all applicants should be made aware in the very early stages of what the ultimate conditions of license will be so that they can be under no misapprehension as to what improvements should be made to their premises within the stated period.

DEPARTMENTAL RESPONSIBILITY

There is no doubt that in some areas the importance of efficient and highly skilled administrative control of licensing and supervision of pasteurising and sterilising plants has not been realised. Such control as exists has amounted to little more than the taking of a number of samples. We are bound to emphasize with all the force at our command that the processes of pasteurisation and sterilisation

are extremely technical and involve the most expert supervision. The problem is all the more important because of the narrow margins of safety and because of the danger of giving a false sense of security to Health Authorities and to the public. The responsibility for ensuring that milk pasteurised or sterilised under licence has been efficiently treated is a very serious one and one which must be handled by properly trained Public Health department staffs. Although sampling is important and has its place in the system of control, at the very best it can only represent a signal. The problem of the qualified staff is to ensure that the system remains on the rails during periods between signals.

FREQUENCY OF INSPECTION AND SAMPLING

Many of these plants handle considerable quantities of milk and very frequent inspection and sampling is therefore necessary. It is desirable that frequency of inspection should not fall below once weekly and on each visit at least one sample should be taken. As experience of the operation of particular plants increases it may be found necessary to make visits even more frequently.

It should be realised that the operation of pasteurising and sterilising plants is largely a matter of routine on the part of the dairymen, and visits made at different times and different days of the week will enable the officer to check thoroughly the working of the plant throughout the various stages.

A thorough examination of processing records is necessary at each visit, and if suitably kept, the records will check with the officer's observations regarding inter alia the cleansing and sterilising run, the time-temperature relationship during processing and plant breakdowns. Reasons for breaks in processing should be clearly shown on the records.

Samples taken at the plant will provide a further indication of the efficiency of processing but for all formal and comparative purposes samples must be taken on the day of delivery.

TUBERCULOSIS IN MILK

Much emphasis was placed by Professor Wilson during the Course on the fact that the evidence that the tubercle bacilli is destroyed by pasteurisation is very inadequate. Moreover, many references were made to the very narrow margin of safety particularly in H.T.S.T. pasteurisation and to the risk of mixing a very small quantity of improperly pasteurised milk with a supply which has been properly treated. Under the circumstances and particularly in view of the large volumes and mixtures of milk involved at these plants we are emphatic in our view that sampling of pasteurised milk for biological examination should be carried out at regular intervals. It is undesirable to specify the frequency of these intervals because a great deal will depend upon the number and types of herds supplying the dairy, upon the type and efficiency of

the pasteurising equipment, and upon the limitation of laboratory facilities, but wherever possible the number of samples should not fall below four per annum and it would in our view be better increased to once monthly.

HEALTH OF OPERATIVES

Views were expressed during the Course that all milk operatives should be subjected to a comprehensive medical examination and we have looked into the possibilities of this. We find that there is considerable evidence in areas where something of the sort has been attempted that better results are produced by concentrating on general clean food handling methods e.g. by emphasizing the need for personal cleanliness, preventing droplet infection, etc., and we are agreed that at the present time this would be the better course to adopt.

LICENSING

We do not anticipate any serious difficulty in dealing with new applications for licences, for Licensing Authorities start under such conditions with a clean sheet and it is up to them to see that the conditions are satisfactory, but we are very concerned at the position as regards many existing licensed premises where licences have been granted by other Authorities and where conditions do not comply with the standards which we regard as adequate. Wherever the Licensing Authority considers that the defects are such as would endanger seriously the milk supply, the licensee might be given an opportunity within a reasonable and stated time to meet the Licensing Authority's conditions. But where these conditions are not met in the time given or where the defects are so serious as to endanger seriously the condition of the milk supply we consider the Licensing Authority would be lacking in its duty if it failed to take steps to secure the cancellation of the licences.

In general terms we feel that the responsibility for securing compliance with the legal and technical requirements for pasteurised and sterilised milk—for securing in fact that these milks are properly treated and consequently provide that measure of safety for which the requirements are designed—is such that we should be firm in our advice to our authorities and not advise them to accept even temporarily any deviation from the requirements if that deviation would be likely to reduce the quality of pasteurised and sterilised milk sold under licence. The general public must have confidence in these designations and that confidence must be sustained by the highest integrity in officials and dairymen alike.

CO-OPERATION

Arrangements for co-operation should be made at three levels :—

(a) Within the County there should be free exchange of information between the Licensing Authorities in that

County and between the County and County Districts who are Registration Authorities for premises.

(b) At County level there should be a free inter-change of information between neighbouring County areas.

(c) At national level we feel that this Committee should be in the position to discuss problems affecting the pasteurisation and sterilisation of milk with national organisations concerned with its various branches.

We have in mind inviting representatives of the Dairy Industry, the National Public Health Laboratory Service, the Dairying Research Station at Reading and the Ministry of Food and Ministry of Health to arrange a free interchange of information between us and if necessary to arrange meetings from time to time. Such exchanges would not affect the normal consultations which take place with the Local Authorities on matters relating to administration and they would be confined entirely to technical problems arising from the operation of the Act and Orders.

TECHNICAL CONSIDERATIONS

It is neither possible nor desirable at this stage to be dogmatic as to all the technical conditions which should be sought in these processes, but we feel that the matters dealt with in the following notes are of fundamental importance and may be added to as time goes on.

TECHNICAL NOTES

I. H.T.S.T. Equipment

We are impressed with the references during the Course to the narrow margin of safety in the H.T.S.T. type of plant and feel that particular attention should be drawn to Professor Wilson's reference to the very steep curve indicated by plotting the mortality rate of organisms against temperatures. At the present time trade interests demand the preservation of a good cream line but with the extension of specified areas the necessity for this demand may possibly decrease. As a result it may be possible to require improvements in the time-temperature relationship without adversely affecting these interests. The times and temperatures laid down in the Regulations must be regarded as a minimum and we recommend that no licence should be granted under any circumstances where the conditions fall below these standards. At the same time the Committee feels that it would be of advantage to investigate alternative time-temperature relationships.

In the meantime the following notes are important in regard to the licensing and supervision of these plants :—

(i) There is no simple method of checking the holding period while the apparatus is in use. Reliance must therefore be placed upon thermometer readings and upon the efficiency of the flow diversion arrangements.

(ii) All applications for licences should be accompanied by a certificate from the manufacturers of the plant as to the guaranteed holding period provided, although this should not absolve the officer of the Licensing Authority from testing new plants to ascertain that the holding period is satisfactory.

(iii) The checking of the action of flow diversion valves is difficult and may vary as between different types of plant. The absolute test is, of course, to shut off the steam valve, watch the temperatures, and see what happens. It is recommended that full data as to the operation of this valve should be recorded for each plant licensed.

II. "HOLDER" TYPE EQUIPMENT

(i) Many of the existing "batch" pasteuriser type of plants have no automatic temperature control arrangements, and until this is required by the Regulations, after a date to be appointed, Licensing Authorities will have to exercise their judgment in the light of what they know of the operation of individual plants and the methods of operation. But we feel that licensee's attention should be drawn to the value of automatic temperature control and that where this is not provided the plant should be most rigorously supervised.

(ii) The formation of "foam" as a result of careless handling of the milk, or more particularly as a result of defective and worn pumps and leaking joints causing aeration of the milk is dangerous. A "foam" temperature as much as 35°F. below the bulk of the holder milk has been recorded and the dangers arising from mixing this with the bulk of pasteurised milk are obvious.

(iii) Licensing Authorities should satisfy themselves that holder plants provide efficient heating of the whole bulk of the milk and should examine the plant for possibilities of "dead space" milk, and leaking outlet valves which permit the contamination of the pasteurised milk by small quantities of milk which are in fact raw. Means of agitating the milk should be insisted upon where necessary.

III. THERMOMETERS

Such indicating and recording thermometers as the Licensing Authority shall consider necessary shall be installed in suitable places in the apparatus in which the milk is pasteurised so as to indicate the temperatures at which the milk is retained and to which the milk is cooled, and we feel that thermometers should be installed on the following basis :—

H.T.S.T. Plants

(a) Temperature and Holding time recording instruments at the outlet from the heating unit and at the flow diversion valve.
(b) Indicating thermometer on the holder tube.
(c) Recording thermometer on the finished milk outlet (the cooled milk).

Holder Plants (Controlled flow)

(a) An indicating thermometer on the pre-heater.
(b) Recording and indicating thermometers at the milk inlet and outlet points.
(c) A recording thermometer at the outlet of the finished milk (cooled milk).

Holder Plants (Batch type)

(a) An indicating thermometer on the pre-heater if used.
(b) Recording and indicating thermometers side by side in the holder.
(c) An indicating or recording thermometer in suitable positions at the outlet from the cooler (cooled milk).

Special Notes : Re Thermometers.

1. It is regarded as essential that indicating and recording thermometers placed at specific points should have their immersion bulbs at the same level. This relates particularly to the holder type of plant.

2. Recorders should be locked.

3. There should be logged and inscribed on all recording thermometer charts used in conjunction with a batch pasteuriser, times of commencement and completion of filling and of emptying.

4. Thermometers used by officers for testing purposes must be certified by the National Physical Laboratory. Plant thermometers should be checked at regular intervals by immersing them together with the testing thermometer, in a bucket of water warmed to the same temperature approximately as that required by the regulations, and by reading the temperatures indicated after at least 2 minutes. It is important that the water should be kept stirred during testing.

5. Indicating thermometers should wherever possible be of the type which has the scale engraved upon the glass stem of the apparatus, and not upon the panel fixed behind the thermometer.

6. Recording thermometers should be carefully checked for " looseness " and irregular movement in the recording apparatus.

7. Since there are such a wide variety of designs of the various types of plant, it is impossible to have hard and fast rules laid down as to the position and types of thermometer and the foregoing is intended as a general guide. The important point is that the temperatures at which the milk is retained and to which the milk is cooled shall be indicated for operational purposes and recorded for supervisory purposes.

IV. Cooling

(i) All milk coolers other than the plate exchanger type should be fitted with removable covers.

V. Water Supplies

Particular care should be given to the water supply to pasteurising establishments and attention is drawn especially to the serious results of using a contaminated water supply, as for example in South Wales during recent years. Whenever an application for licence is received, samples of the water supply should be submitted for both chemical and bacteriological examination, and when the licence is granted and the water supply is taken otherwise than from a mains supply, further samples should be taken for bacteriological examination at appropriate intervals.

VI. Premises

The Milk and Dairies Regulations 1949 should be complied with in their entirety, subject to the comments contained under " Licensing " (page 4), and it is recommended that before a licence be granted the local authority responsible for the registration of the premises should be consulted as to compliance with the regulations. It is important that the normal sanitary requirements relating to floors, floor drainage, impervious walls, lighting and ventilation, should be complied with, and particular attention is drawn to the fact that direct sunrays should as far as possible be eliminated from the dairy. This implies that natural lighting should have a northern aspect as far as is practicable. Great care should be exercised in the examination and approval of the methods of cleansing and sterilising milk appliances and vessels, and if necessary, samples should be taken, and the Bacteriologist consulted to see that the method proposed under the Regulations is in fact satisfactory.

With regard to the workers, washing facilities shall be provided **on the premises** (not at some distant house or place), and it should be observed that the workers do in fact use the facilities. A state of thorough cleanliness of the outer clothing of the workers is necessary and required by the regulations, and this can only be achieved and maintained if clean, washable overalls are used.

T. RUDDOCK-WEST,
Association of
County Medical Officers.

Joint Secretaries.

GEO. W. CURTIS,
Association of
County Sanitary Officers.

6th July, 1950.

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